

a cavity in said housing, [said cavity having a first end disposed substantially adjacent to said side wall of said bore,] and (v) an opening connecting said bore and said [first end of said] cavity;

a tubular lens carrier having a distal end and a proximal end, said lens carrier (i) having an outer surface that is characterized by a longitudinally-aligned series of rack gear teeth, an open distal end, and an open proximal end, (ii) containing at least one coaxially mounted focusing lens and (iii) being slidably disposed in said bore for selective movement between a proximal-most position and a distal-most position;

[a motor assembly mounted in said cavity said motor assembly including a reversible powered drive device] a reversible electro-mechanical drive assembly mounted to said housing, said drive assembly having an output shaft;

gear means connecting said output shaft to said series of rack gear teeth for selectively moving said lens carrier between its proximal-most and its distal-most positions in said bore in response to rotation of said output shaft [by said drive device], said gear means comprising a gear disposed in said cavity and engaged with said rack gear teeth;

whereby an image captured by said image capturing device and relayed by said at least one focusing lens may be focused on an image receiving device by movement of said lens carrier.

2. (Amended) A motorized focusing coupler device according to claim 1 further comprising biasing means for urging said tubular lens carrier toward one of the ends of said bore.

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3. (Amended) A motorized focusing coupler device according to claim 2 wherein said biasing means comprises a coil spring disposed in said bore between a stop adjacent one of the ends thereof and said tubular lens carrier.

4. (Amended) A motorized focusing coupler device according to claim 1 further including windows closing off said open distal and proximal ends of said lens carrier.

5. (Amended) A motorized focusing coupler device according to claim 1 wherein said gear [means comprise] is a worm gear [axially] attached to said [free end of said drive shaft such that] output shaft with at least a portion of said worm gear [extends] extending through said opening and [the teeth of said worm gear mesh] meshing with said rack gear teeth [on the outer surface of said lens carrier].

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6. (Amended) [The] A motorized focusing coupler device according to claim 5 wherein said lens carrier has a longitudinal axis, and said [drive] output shaft extends parallel to said longitudinal axis of said lens carrier.

7. (Amended) [The] A motorized focusing coupler device according to claim 5 wherein said worm gear is a conical spiral gear, said lens carrier has a longitudinal axis, and said [drive] output shaft is disposed at an acute angle to said [first] longitudinal axis of said lens carrier.

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11. (Amended) A focusing device, said device comprising:

~~a housing;~~

~~said housing having (i) a distal end and a proximal end, (ii) a substantially straight bore extending between said distal and proximal ends, (iii) first means at said distal end of said housing for mechanically attaching said housing to an image-capturing device, and (iv) second means at said proximal end of said housing for mechanically attaching said housing to an image-receiving apparatus;~~

~~a lens transport assembly comprising a hollow lens carrier having a distal end, a proximal end and at least one focusing lens secured coaxially therein, said lens transport assembly being disposed within and sized so as to be in a close-fitting sliding relation with said bore, said lens transport assembly being slidable bidirectionally in said bore [toward and away from said first and second windows]; and~~

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~~electromechanical means mounted to said housing and coupled to said lens transport assembly for moving said lens transport assembly bidirectionally in said bore, so as to adjust the focusing of an image passed by said at least one focusing lens, said electromechanical means comprising a rack of gear teeth carried by said lens carrier, said rack gear teeth extending lengthwise of said bore, a reversible electric motor exterior of and attached to said housing, said motor having an output shaft, and gear means within said housing driven by said output shaft and engaged with said rack of gear teeth for causing movement of said lens transport assembly in said bore in response to according to the rotation of said output shaft.~~

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~~12. (Amended) A focusing device according to claim 11 further including a spring disposed in said bore so as to urge said lens transport assembly toward [a predetermined] one end of said [windows] bore.~~

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~~13. (Amended) A focusing device according to claim [11] 12 wherein said housing comprises a first internal stop adjacent said distal end of said bore, and said spring is disposed between said first stop and the adjacent end of said lens transport assembly.~~

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~~17. (Amended) A focusing device according to claim 11 further including an image-receiving apparatus attached to said second [connecting] means.~~

~~19. (Amended) A focusing device according to claim 11 wherein said housing includes first and second transparent windows closing off [the] said bore at said distal and proximal ends [of said bore] respectively.~~

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~~20. (Amended) An image viewing and focusing system, said system comprising in combination:~~

~~(a) an image capturing device;
(b) a video camera;
(c) an electromechanically operable focusing coupler device interposed between and connecting said image capturing device and said camera, said coupler device providing an optical path for transmitting images from said image capturing device to said camera, said coupler device comprising:~~

a housing having proximal and distal ends, a straight bore in said housing extending between said proximal and distal ends, a lens transport assembly movably disposed in said bore in said housing, and electromechanical means mounted to said housing for moving said lens transport assembly bidirectionally in said [housing] bore;

[said housing having a distal end and a proximal end, and an internal surface defining a substantially straight bore extending between said distal end and said proximal end;]

said lens transport assembly having a lens carrier containing at least one focusing lens, said lens carrier having a cross-sectional size and shape such that it makes a close sliding fit in said bore; and

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said electromechanical means comprising a reversible electric motor mounted to said housing, and gear means within said housing and coupling said motor and said lens transport assembly for moving said lens transport assembly in said bore according to the direction of operation of said reversible electric motor, said motor having an output shaft, said gear means comprising a rack of gear teeth carried by said lens transport assembly and extending lengthwise of said bore, and a rotatable gear disposed in said housing in engagement with said rack of gear teeth, said rotatable gear being coupled to said output shaft, whereby energization of said motor will cause said output shaft to drive said gear means and thereby effect movement of said lens carrier in said bore according to the direction of rotation of said shaft.

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22. (Amended) The system according to claim 20 wherein said motor is contained in a motor support housing attached to said [first-mentioned] housing.

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26. A [pneumatically operable] motorized focusing coupler device comprising:

- (1) a housing having first and second opposite ends and a cylindrical inner surface defining a straight bore that extends between first and second opposite ends, said bore having first and second ends corresponding in relative position to said first and second ends of said housing;
- (2) a lens transport assembly comprising a hollow cylindrical lens carrier and at least one focusing lens mounted to said carrier in coaxial relation therewith, said carrier being disposed within and in close fitting relation with said bore so as to be slidable axially in said bore;
- (3) a first stop means in said bore adjacent said first end thereof;
- (4) a compression spring mounted within said bore between said stop means and said lens transport assembly, said spring acting to urge said lens transport assembly to move toward said second end of said bore;
- (5) a second stop means in said bore adjacent said second end thereof for limiting movement of said lens transport assembly away from said first end of said bore;
- (6) first and second transparent means closing off the opposite ends of said bore;
- (7) cavity in said housing communicating with said bore between the ends thereof;
- (8) a reversible electric motor mounted to said housing, said motor having an output shaft; and
- [(8) gear means coupled with output shaft said lens transport assembly via said cavity; and]

(9) gear means coupling said output shaft with said lens transport assembly, said gear means comprising a gear mounted within said housing and driven by said output shaft and a rack of gear teeth attached to said lens transport assembly, said rack of gear teeth extending lengthwise of said bore and engaged with said gear,

[(9) a reversible electric motor having its output shaft connected to said gear means,] whereby rotation of said output shaft due to energization of said motor will cause said lens transport assembly to move forward or backward in said bore according to the direction of rotation of said output shaft, with movement of said lens transport assembly resulting in adjustment of the focus of images passed by said at least one focusing lens.

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27. (Amended) A motorized focusing coupler device according to claim 26 further including an endoscope releasably attached to said first [connecting means] end of said housing in line with said bore, and an electronic camera releasably attached to said second [connecting means] end of said housing in line with said bore.

PLEASE ADD THE FOLLOWING NEW CLAIMS:

28. A motorized focusing coupler device according to claim 26 wherein said gear means further comprises a worm gear attached to said output shaft and engaged with said gear.

29. A motorized focusing device according to claim 1 wherein said gear is a pinion gear and further wherein said gear means also includes a worm gear attached to said output shaft and rotatable therewith, said worm gear being in driving engagement with said pinion gear.

30. A motorized focusing coupler device for use in coupling the image capturing portion of an optical instrument to a camera, said coupler device comprising a housing having an elongate internal chamber defining a pathway for optical images and a cavity that communicates with said chamber intermediate opposite ends of said chamber, a lens transport assembly disposed in said chamber for relative bi-directional movement between opposite ends of said chamber, said lens transport assembly comprising (1) a lens carrier, (2) at least one focusing lens mounted to the lens carrier in coaxial alignment with the longitudinal axis of the chamber, and (3) a longitudinal series of rack gear teeth carried by said lens carrier, a reversible electromechanical drive device mounted to said housing, said drive device having an output shaft, and gear means in said cavity connecting said rack gear teeth to said output shaft, whereby to translate rotational movement of said output shaft to longitudinal

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movement of said lens transport assembly between the opposite ends of said chamber.

31. A coupler device according to claim 30 further including first and second windows closing off the opposite ends of said chamber.

32. A coupler device according to claim 30 wherein said housing has an external opening communicating with said cavity, and said drive device comprises a reversible electric motor mounted in a motor support housing that is attached to said housing at said external opening.

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33. A motorized focusing coupler device, said coupler device comprising:
a housing having a distal end and a proximal end and comprising (i) a first substantially straight bore having a distal end and a proximal end, (ii) first attaching means at said distal end of said housing for mechanically attaching said housing to an image capturing device, (iii) second attaching means at said proximal end of said housing for mechanically attaching said housing to an image receiving apparatus, (iv) a second bore in said housing, and (v) a cavity connecting said first and second bores;

a tubular lens carrier slidably disposed in said first bore for reciprocal movement along said first bore between a proximal-most position and a distal-most position, said lens carrier supporting at least one coaxially mounted focusing lens and a longitudinally-extending series of rack gear teeth;

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a reversible electro-mechanical drive assembly mounted to said housing, said drive assembly having an output shaft extending into said second bore;

gear means connecting said output shaft to said series of rack gear teeth for selectively moving said lens carrier between its proximal-most and its distal-most positions in said bore in response to rotation of said output shaft, said gear means comprising a worm gear attached to said free end of said output shaft, and a helical pinion gear rotatably disposed in said cavity, with the teeth of said helical pinion gear in meshing engagement with the teeth of said worm gear and said rack gear teeth;

whereby an image captured by said image capturing device and relayed by said at least one focusing lens may be focused on an image receiving device by movement of said lens carrier.

34. A motorized focusing coupler device according to claim 33 wherein said second bore extends parallel to said first bore.

REMARKS

As a result of this amendment, the claims now in the application 1-7, 11-20, 22-24 and 26-34.

Applicant respectfully request reconsideration of the rejection of claims 1-8, 11-19 and 26-27 under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as his invention.

In response to this request for reconsideration, it should be noted that Applicant has amended the claims so as to avoid any question of indefiniteness. Claim 26 has been amended to delete the term